the step of aligning the first diffractive optical part and the second diffractive optical part with each other while observing a mark present on the optical effective area of each of the first diffractive optical part and the second diffractive optical part; and

the step of fixing the first diffractive optical part and the second diffractive optical part with a space therebetween.

9. (Amended) A metal mold for manufacturing a diffractive optical element comprising:

a first area for molding a phase-type diffractive grating; and

a second area provided in said first area for molding a mark for aligning said diffractive grating with another member.

REMARKS

In view of the above amendments and the following remarks, Applicant requests favorable reconsideration and allowance of the above-identified application.

Claims 1-6, 8, and 9 are now pending in this application, with Claims 1, 8, and 9 being independent. By this Amendment, Applicant has canceled Claim 7, and amended Claims 1-5, 8, and 9.

The drawings stand objected to for failing to comply with 37 C.F.R. § 1.84(p)(5). Specifically, the Office Action states that reference numeral 7 is used in the description but not shown in the drawings. Applicant respectfully directs the Examiner's attention to Figures 3B and 5, which include reference numeral 7.

Claim 4 stands objected to under 37 C.F.R. § 1.75(c) as being an improper dependent form for failing to further define the subject matter of Claim 1. Applicant has amended Claim 1 to attend to this matter.

Claims 2 and 3 stand rejected under 35 U.S.C. § 112, second paragraph, as being indefinite. Applicant has amended those claims to attend to the matters noted in the Office Action as giving rise to the rejection. Accordingly, Applicant requests withdrawal of the § 112, second paragraph, rejection.

The Office Action also notes that, should Claim 6 be found allowable, Claim 7 would be objected to under 37 C.F.R. § 1.75 as being a substantial duplicate thereof. Applicant has canceled Claim 7, rendering this matter moot.

Claims 1-8 stand provisionally rejected under judicially created doctrine of obviousness-type double patenting as being unpatentable over Claims 1-4 and 8 of U.S. Application No. 09/401,660, and Claims 1-10 of U.S. Patent Application No. 09/411,632. Applicant requests that these provisional rejections be held in abeyance until the claims of the present application are otherwise indicated as being allowable.

Claims 1-8 stand rejected under 35 U.S.C. § 103 as being unpatentable over U.S. Patent No. 5,847,877 (Imamura, et al.) in view of U.S. Patent No. 5,214,535 (Harris,

et al.). Claim 9 stands rejected under 35 U.S.C. § 103 as being unpatentable over Harris, et al. Applicant traverses these rejections.

As recited in independent Claim 1, Applicant's invention is directed to a diffractive optical element having a first diffractive optical part and a second diffractive optical part, each having a phase-type diffractive grating. The diffractive optical parts are disposed in proximity to each other with a space therebetween. Each optical part has an adjustment mark in an optical effective area thereof.

Independent Claim 8 is directed to a method of manufacturing a diffractive optical element. The method includes, *inter alia*, a step of aligning a first diffractive optical part and a second diffractive optical part with each other while observing a mark present on the optical effective area of each of the diffractive optical parts. Independent Claim 9 is directed to a metal mold for manufacturing a diffractive optical element. The mold includes a first area for molding a phase-type diffractive grating and a second area provided in the first area for molding a mark for aligning the diffractive grating with another member.

Thus, the present invention provides an alignment mark in an optical effective area of a phase-type diffractive grating.

The Imamura, et al. patent is directed to a diffractive optical element having a first layer and a second layer made of different materials. The Office Action acknowledges that this patent fails to describe alignment marks for aligning the different optical parts.

The Office Action cites the Harris, et al. patent as describing alignment marks that may be formed at predetermined locations on the surface of two engaging substrates. However, Applicant submits that the Harris, et al. patent merely describes that the alignment marks are formed on the substrates themselves, and does not describe providing alignment marks on optical effective areas.

Not in claim

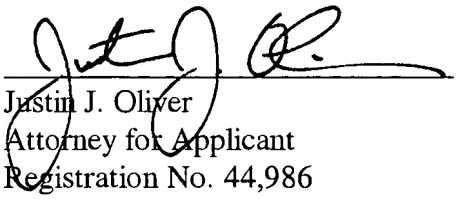
Accordingly, Applicant submits that the Imamura, et al. and Harris, et al. patents, taken alone or in combination, fail to disclose or suggest at least (i) each of a first diffractive optical part and a second diffractive optical part having a mark in an optical effective area thereof for aligning them, as recited in independent Claim 1; (ii) aligning a first diffractive optical part and a second diffractive optical part with each other while observing a mark present on the optical effective area of each of those parts, as recited in independent Claim 8; and (iii) a first area for molding a phase-type diffractive grating and a second area provided in the first area for molding a mark for aligning the diffractive grating with another member, as recited in independent Claim 9.

For the foregoing reasons, Applicant submits that the independent claims are allowable over the applied documents, and requests withdrawal of the rejections under 35 U.S.C. § 103.

The remaining claims in the present application are dependent claims which depend from the independent claims, and thus are patentable over the applied documents for reasons noted above with respect to those claims. In addition, each recites features of the invention still further distinguishing it from the applied patents. Applicant requests favorable and independent consideration thereof.

Applicant's undersigned attorney may be reached in our Washington, D.C. office by telephone at (202) 530-1010. All correspondence should continue to be directed to our below-listed address.

Respectfully submitted,



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VERSIONS WITH MARKINGS TO SHOW
CHANGES MADE TO THE CLAIMS

1. (Amended) A diffractive optical element comprising:

a first diffractive optical part having a phase-type diffractive grating; and

a second diffractive optical part having a phase-type diffractive grating [formed of a material differing from that of said first diffractive optical part];

said first diffractive optical part and said second diffractive optical part being disposed in proximity to each other with a space [an air layer] therebetween;

each of said first diffractive optical part and said second diffractive optical part having a mark in an optical effective area thereof for aligning them [with the optical effective areas thereof].

2. (Amended) The diffractive optical element of Claim 1, wherein the diffractive grating of each of said first diffractive optical part and said second diffractive optical part [has] is a diffractive grating formed into a concentric circular shape, and [the projection area of] said mark [is] has a size of 0.1% or less [relative to the] of a projection area of [the] a first diffractive grating area as counted from the center.

3. (Amended) The diffractive optical element of Claim 2, wherein the influence of said mark upon the optical performance of said diffractive optical element is

smaller than the reduction [in the] of optical performance [during the making of] due to the manufacturing accuracy associated with said diffractive optical element.

4. (Amended) The diffractive optical element of Claim 1, wherein [the diffractive gratings] said first diffractive optical part and said second diffractive optical part [have] are formed of difference materials.

5. (Amended) The diffractive optical element of Claim 1, wherein the depth of said mark is 10% or less relative to the depth of the diffractive grating of each of said first diffractive optical part and said second diffractive optical part [has].

8. (Amended) A method of manufacturing a diffractive optical element comprising:

the step of molding a first diffractive optical part having a phase-type diffractive grating;

the step of molding a second diffractive optical part having a phase-type diffractive grating;

the step of aligning [said] the first diffractive optical part and [said] the second diffractive optical part with each other while observing a mark present on the optical effective area of each of [said] the first diffractive optical part and [said] the second diffractive optical part; and

the step of fixing [said] the first diffractive optical part and [said] the second diffractive optical part with a space [an air layer] therebetween.

9. (Amended) A metal mold for manufacturing a diffractive optical element comprising:

a first area for molding a phase-type diffractive grating; and

a second area provided in said first area for molding a mark for aligning said diffractive grating with [other] another member.

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